# VIRTUAL CHANGING ROOM USING IMAGE PROCESSING

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**Abstract -** *It is more convincing for users to have their own 2-D body shapes in the virtual fitting room when they shop clothes online. However, existing methods are limited for ordinary users to efficiently and conveniently access their 2-D bodies. We propose an efficient data-driven approach for developing web application for 2-D body customization. Users stand naturally and their photos are taken from front and side views with a web camera. They can wear casual clothes like a short-sleeved/long-sleeved shirt and short/long pants. First, we are proposing a user-friendly interface to semi-automatically segment the human body from photos. Then, the segmented human contours will be scaled and translated to the ones under our virtual camera configurations. Through this way, we only need one camera to take photos of human in two views front view and side view. Finally, we learn body parameters that determine the 2-D body from dressed-human silhouettes with cascaded regressors. The regressors take the appropriate body point (neck and shoulder point). Body parameters regression only costs 1.26 s on web application which ensures the efficiency of our method.*

***Key Words***: **Body parameters regression, data-driven application, image-based 2-D body shape estimation, image processing, Kinect sensor.**

## 1.INTRODUCTION

Customized body shapes play an important role in the popularity of virtual fitting room for online shopping. When the 2D body model in the fitting room owns the customer's shape, the buyer can get convincing visual information and size suggestions. This produces a win-win situation for both customers and sellers, saving their time. For ordinary online customers, they want the estimation of their 2D body shapes to be convenient, fast and accurate. However, existing methods cannot satisfy all the requirements. High-end scanners can be used to scan individuals with minimal or tight clothes for 32 body reconstruction. Nevertheless, minimal or tight dressing makes customers embarrassed and scanners are costly and not widely used. Kinect provide a less expensive way for 2D body reconstruction, but they are still not widely available. Images are more convenient to access, and some researchers take minimally dressed human images as input to constrain parametric human body models. Parametric models are trained using a database of human bodies, and they represent 2D bodies by deforming a template body with a set of parameters.

### 1.1 IMAGE SEGMENTATION

Our image segmentation is based on the Grab cut method and we develop a user-friendly interface for segmentation. As Fig.1 shows, user firstly point out two corners of a rectangle to surround the human body. All the area outside of the rectangle is background. They can add several strokes indicating the foreground area and the background area both before and after Grab cut. When the Grab cut method is completed, we set the background areas darken. Due to the limited screen size of a phone, we design zoom function for more convenient strokes input. What we are concerned about is the perfect dressed-human contour, instead of the perfect segmentation. We compute the contours of the mask image of current segmentation and select the biggest one as human contour. Take the second ''Grab cut Result'' for example, despite some background areas are not darken, we can get the desired result.

## 2. SILHOUETTES ADJUSTMENT

We can not regress body parameters directly using segmented human contours on account of unknown camera configurations. When we use the configurations of virtual cameras which are set during training phase, we need to adjust the sizes and locations of human contours in the silhouettes. This section illustrates how we approximately transform our segmented contours to the ones under virtual camera configurations. As Songetal. pointout, camera configuration(intrinsic and extrinsic parameters) has an effect on the size and shape of human contours. Nevertheless, perspective projection has little effects on the shape of body contour when the following conditions are satisfied:

(1) the camera points approximately to the center of human, (2) the direction of camera view is nearly orthogonal to human plane, and (3) the distance between camera and human is relatively far, compared with which, the thickness of human body can be ignored. The set here conditions are easy to be achieved when we take photos with a mobile device.

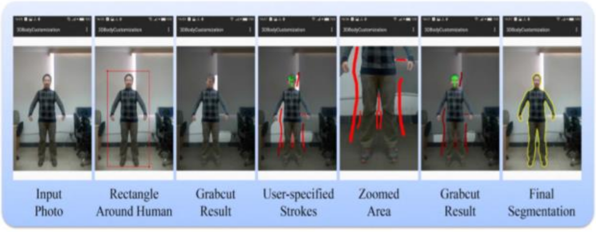


**Fig -1**: Image segmentation.

In this section, we introduce how we regress body parameters (θ, β) which determine a 3D body from front and side silhouettes. The training data are introduced in section III-B, and each training sample for training parameters regression consists of initial body parameters, target body parameters and a pair of silhouettes (in front and side views). We prepare 9 sets of initial parameters whose corresponding heights range from 150cm to 190cm with an interval of 5 centimeters. Initial parameters for each sample are decided by the corresponding height. We use the boosting tree regression method to regress the residual between initial body parameters and target body parameters according to front and side silhouettes. The residual is decreased little by little through a series of cascaded regressors Gi (i = 1,2,···,m, where m denotes the total number of regressors).The itch regressor Gi takes input silhouettes and the body parameters updated by last regressor Gi−1 as input, and the relative relationship between current body parameters and used to guide the change of body parameters.

We use the training database containing 5405 × 3 pairs of naked and dressed 3D bodies, which is created by Song et al, to prepare training data. Song et al.manually dress 3D bodies with three sets of clothes, namely L/L,S/LandS/S, which are respectively abbreviated for long sleeved shirt and long pants, short-sleeved shirt and long pants, and short-sleeved shirt and short pants. They design the clothes types by a software based on cloths imulation and dress bodies one by one with suitable clothes size, which needs a lot of efforts. The clothes types currently chosen are most commonly used in daily life and well simulated. Our approach can be applied to more clothes types once the data base prepares corresponding naked and dressed body pairs.

## 3. CONCLUSIONS

We propose a data-driven application for ordinary customers to efficiently and conveniently access their 2D body shapes, in order to meet the need of virtual fitting room in online shopping. With photos captured by phone camera, we use Grabcut method to segment human. To achieve good segmentation, we are providing facility to user to zoom in and out the image and add strokes indicating human and background and then segmented human contours will be scaled according to human height and translated using the regressed reference points in the silhouettes.By training a series of regressors to predict body parameters and avoiding camera calibration proposed method will be more convenient.

## REFERENCES

[1] K.-L. Cheng, R.-F. Tong, M. Tang, J.-Y. Qian, and M. Sarkis, "Parametric human body reconstruction based on sparse key points," IEEE Trans. Vis. Comput. Graphics, vol. 22, no. 11, pp. 2467–2479, Nov. 2016..

[2] J Tong, J. Zhou, L. Liu, Z. Pan, and H. Yan, "Scanning 3D full human bodies using Kinects," IEEE Trans. Vis. Comput. Graphics, vol. 18, no. 4,pp. 643–650, Apr. 2012.

[3] J.Boisvert, C .Shu, S. Wuhrer, and P. Xi,"Three -dimensional human shape inference from silhouettes: Reconstruction and validation," Mach. Vis. Appl., vol. 24, no. 1, pp. 145–157, Jan. 2013.

[4] International Journal of Computer Science Trends and Technology (IJCST)- Volume 2 Issue 2, Mar-Apr. 2014.